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# Compilation of **ABSTRACTS**

**Clinical Laboratory Science**  
2011



**SLRC**

## **INTRODUCTION**

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# ***Clinical Laboratory Science***

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Larrimore, C. (2011). Chronic familial Mediterranean fever with development of secondary amyloidosis. *Clinical Laboratory Science*, 24(1), 2-7.

**Abstract:** A 20-year-old Turkish male presented with fever, abdominal pain, and systemic lethargy. His clinical history revealed symptoms to be self-limiting but reoccurring over the past six months. Blood and urine specimens collected indicated amyloidosis. A kidney CT image indicated kidney inflammation. He was diagnosed with Familial Mediterranean Fever with the development of secondary amyloidosis and treated with colchicine.

**Subjects:** 1. Amyloidosis, 2. Hereditary Diseases, 3. Inflammation -- Familial and Genetic



Stunkard, M. E., Pikul, V. T., & Foley, K. (2011).  
Hyperosmolar hyperglycemic syndrome with  
rhabdomyolysis. *Clinical Laboratory Science*,  
24(1), 8-13.

**Abstract:** In this report we describe a patient who presented with nausea, vomiting, diarrhea, tachypnea and mental impairment. The patient had elevated serum lipase, troponin-I, creatinine kinase and myoglobin along with severe hyperglycemia (> 2000 mg/dl) and no ketouria. This patient was found to have nonketotic hyperosmolar hyperglycemia with concomitant rhabdomyolysis and myocardial infarction.

**Subjects:** 1. Diagnosis, Laboratory  
2. Hyperglycemic Hyperosmolar Nonketotic Coma --  
Diagnosis  
3. Rhabdomyolysis -- Diagnosis

Pennell, P. A., Brennan, L. E., Burhans, R. L., & Ostrowski, S. E. (2011). Packaging and shipping capabilities of New York State hospital laboratories: a 3-year drill assessment. *Clinical Laboratory Science*, 24(1), 14-21.

**Abstract:** In a previous publication, we discussed the results of the 2006-2007 New York State (NYS) Hospital Laboratory Drill Series which emphasized the need for ongoing testing and evaluation of laboratory preparedness capabilities, particularly those required to support hospital functions during a public health emergency. In this paper, we will discuss how a follow-up drill series in 2007-2008 was implemented in an effort to re-assess the ability of NYS acute care hospital facilities to recognize and respond to a suspected bioterrorism, chemical terrorism or pandemic flu emergency specimen submission event. We will explain how the results of the follow-up drill series, when compared to those of the original exercise, warranted a statewide hospital laboratory preparedness drill held in 2009, focused solely on addressing the overarching deficiency of chemical terrorism (CT) specimen submission capabilities. Although drill results conclude that NYS acute care hospital facilities are much better prepared than 3 years ago to support hospital functions during a CT public health emergency event, they also highlight the continued need to improve competency.

**Subjects:** 1. Clinical Laboratories, Hospital  
2. Disaster Planning 3. Mass Casualty Training  
4. Specimen Handling -- Equipment and Supplies

Davis, D., & Nadder, T. (2011). CLS entry level competences in flow cytometry. *Clinical Laboratory Science*, 24(1), 29-34.

**Abstract:** OBJECTIVE: To define entry level competencies in flow cytometry for CLS generalists. DESIGN: Flow cytometry practitioners completed an electronic survey. Of 134 respondents, 131 met the desired demographics and were analyzed. SETTING: Links to the survey were mailed to 3 listservs (Medlab-L, CLSEduc, Purdue Cytometry) and 2 email groups (ASCLS and AMLI). Participants completed the survey on-line. PARTICIPANTS: The target population was flow cytometry practitioners who had experienced CLS education, earned certification and practiced at least one year in flow. Survey instructions asked participants not to complete the survey if they did not meet the demographic criteria. MAIN OUTCOME MEASURES: A competency was deemed important at entry level if 50% of respondents agreed. RESULTS: There was strong consensus (62-57%) that entry level CLS generalists should be able to 1) perform HIV CD4/CDS monitoring, 2) gate cell populations using forward/side scatter and CD45/bright dim markers and 3) evaluate specimen acceptability. Concepts to understand included leukemia immunophenotyping, quality control and instrument principles (61-53%). Most respondents (74%) felt that memorization of the leukemic CD panels was unnecessary. However, survey results indicated

that the markers and cell type associations to memorize are CD3, CD4, CDS, CD19/20, CD34, CD45 and light chains. Hands-on experience with instruments was not identified as critical. CONCLUSION: CLS educational programs can deliver almost all flow cytometry content in the didactic portion of the curriculum and can restrict CD marker memorization to a limited list. At minimum, HIV monitoring via CD4/CDS counts and concepts of leukemia immunophenotyping should be included.

**Subjects:** 1. Clinical Lab Science, 2. Flow Cytometry

Hansen-Suchy, K. (2011). Evaluating the effectiveness of an online medical laboratory technician program. *Clinical Laboratory Science*, 24(1), 35-40.

**Abstract:** OBJECTIVE: The purpose of this study was to analyze the effectiveness of an online medical laboratory technician program in the academic preparation and development of laboratory professionals. DESIGN: A semi-quantitative comparative research design was used. Several factors were considered in this evaluation. Academic outcomes between online and campus medical laboratory technician (MLT) students was determined by comparing overall and categorical scores on certification exams as well as first time pass rate. Certification exam scores and first time pass rates were also compared to national norms when possible to do so. Demographic data, including age and experience were compared. Additionally, learning styles were assessed to determine if there was a correlation to overall GPA and MLT GPA and if learning styles could be used to predict successful completion of an online Associates of Applied Science. SETTING: The research was conducted at an academic university located in the mountain west United States. PARTICIPANTS: Participants consisted of online and campus students enrolled in a Medical Laboratory Technician program that graduated with their Associate of Applied Science degree between the years 2007-2009. Results of these years were also compared to graduates from 2004-2006 in the same program. MAIN OUTCOME MEASURES:

Certification performance and first time pass rates were the major outcomes measured. Age and experience were correlated. Online learning styles and GPA were also compared to successful degree completion. RESULTS: The researcher found no significant difference in certification performance with regard to total and categorical scores, and first time pass rates between campus and online ML T students. Online students were slightly older and had more experience working in a laboratory in some capacity. Correlation studies showed significant positive correlation between learning styles, GPA, and successful completion of an Associate of Applied Science degree. When registry scores were compared to the prior cohort of onlinp students, some subcategories scores demonstrated significant increase using Chi-squared analysis. CONCLUSIONS: The research demonstrated that t online ML T students studied were as academica prepared as their campus counterparts.

**Subjects:** 1. Academic Performance, 2. Clinical Laboratory Science

Liddell, P. W., & Heuertz, R. M. (2011). Students as vital participants in research projects. *Clinical Laboratory Science*, 24(2), 66-70.

**Abstract:** Inclusion of research coursework into a medical technology or **clinical laboratory science** program is currently viewed as a mark of a good degree program. Examples of this type of coursework are evaluation of scientific papers, techniques of scientific writing, application and performance of statistical analysis and introduction to research ethics (e.g., Institutional Review Board approval process). "While many programs have the ability to recruit experienced scientists into research mentorship of medical technology/**clinical laboratory science** students, it is recognized that not all programs have this ability. It is also recognized that clinical laboratorians are performing critical diagnostic tests and, in this capacity, have the ability to identify research projects that are necessary, evidence-based and timely. It is hereby proposed that clinical laboratorians take advantage of this innate ability and create rich teaching experiences for students by including them in performance of research projects. Because of the fact that students are armed with up-to-date knowledge, have willing and enthusiastic spirits and are highly motivated to learn, they are vital participants in research. The students receive an invaluable active learning experience and possibly a future job; the clinicallaboratorians meet and possibly exceed the research and scholarship expectations of their



institutions; and the scientific community benefits by the science being shared through publication in scientific journals.

**Subjects:** 1. Education, Medical Laboratory Technology  
2. Research -- Education

Behan, K. J., & Merschen, J. (2011). HbA1c does not always estimate average glucose. *Clinical Laboratory Science*, 24(2), 71-77.

**Abstract:** Hemoglobin Alc (HbAlc) testing can be inaccurate in persons with elevated amounts of Hemoglobin F, or with abnormal hemoglobins found in sickle cell trait, HbC trait and HbE trait. These variants are more prevalent in African and Asian Americans, the same demographic that has an increased risk of diabetes. Variant hemoglobins might cause a false increase or decrease in HbAlc, depending on methodology and manufacturer. Case studies of two African American patients, one with and one without variant hemoglobins, are presented. The major methods used to assay HbAlc, immunoassay, HPLC and boronate affinity are described, and compared for their ability to detect variant hemoglobins. An algorithm is proposed to test new patients using the HPLC method to identify or rule out the presence of the most common variant hemoglobins. Patients with variant hemoglobins can subsequently be assigned to HbAlc methods proven to be accurate in the presence of those hemoglobins.

**Subjects:** 1. Blood Glucose -- Analysis, 2. Diagnostic Errors, 3. Hemoglobin A, Glycosylated. 4. Hemoglobinopathies, 5. Laboratory Test Interference

Yontz, C. J., & Waller, K. V. (2011). Homozygous sickle cell anemia and secondary complications: a case study. *Clinical Laboratory Science*, 24(2), 78-84.

**Abstract:** A 26-year-old African-American male presented with chest and back pain, fatigue and a history of the following: homozygous sickle cell anemia, pain crises, stroke, hip replacement following avascular necrosis of the femoral head, priapism, chronic transfusions, iron overload, hypertension, migraine headaches, port infections, depression and type II diabetes.

**Subjects:** 1. Anemia, Sickle Cell -- Complications  
2. Anemia, Sickle Cell -- Therapy

Dill, E. A., Renault, C., & Kirkpatrick, B. D. (2011).  
Trypanosoma brucei infection in HIV positive  
Ugandan male. *Clinical Laboratory Science*,  
24(2), 85-88.

**Abstract:** Human African Trypanosomiasis, or African Sleeping Sickness, is a parasitic infection caused by *Trypanosoma brucei* (gambiense or rhodesiense), and one of the declared neglected tropical diseases. 1 Sleeping sickness has high fatality rates and is a continued threat in several African countries.2 We present characteristic clinical and microbiologic features of a fatal case of African Sleeping Sickness in an HIV-infected individual.

**Subjects:** 1. HIV-Infected Patients,  
2. Trypanosomiasis -- Diagnosis

Krutukculer, N., Karaca, N., & Azarsiz, E. (2011).

Immunoglobulin light chain levels can be used to determine disease stage in children with juvenile idiopathic arthritis. *Clinical Laboratory Science*, 24(2), 93-98.

**Abstract:** OBJECTNE: Patients with some inflammatory diseases have been shown to have increased levels of immunoglobulin light chains. In this study, we measured the concentrations of immunoglobulin kappa (K) and lambda (A) light chains in sera of patients with juvenile idiopathic arthritis (JIA) (study group), familial mediterranean fever (FMF) (disease control group) and in healthy children. Our aim was to compare immunoglobulin light chain levels with other wellknown markers of inflammation, such as the erythrocyte sedimentation rate (ESR) and the acute phase reactants (APRs), serum amyloid A (SAA) and Creactive protein (CRP), to find out if immunoglobulin light chain determinations have any discriminating value in the follow-up of these patients. RESULTS: ESR, CRP, SAA, K and A chain levels and AllgG ratio showed a statistically significant difference between active and remission stages in JIA patients. K correlated very well with SAA and ESR in both stages. On the other hand, A correlated with SAA and ESR only in the remission period. There was no significant difference in K and A chain levels between active and remission stages in FMF patients. In addition, K and A chain concentrations showed no correlation with other markers of inflammation and immunoglobulin levels neither in entire

FMF group nor in different subgroups with respect to clinical status. Immunoglobulin light chains K and A as well as levels of three markers of inflammation were found to be significantly higher in JIA patients who were in the active stage of disease when compared to data of healthy children. CONCLUSION: Ig light chains especially K chain concentrations are helpful to determine disease stage in JIA patients but with our current data, they do not exhibit superiority to any of the classical tests for inflammation. ABBREVIATIONS: ESR erythrocyte sedimentation rate, APRs = acute phase reactants, CRP C-reactive protein, SAA = serum amyloid-A, JIA = juvenile idiopathic arthritis, FMF = familial mediterranean fever, Ig = immunoglobulin, ILAR = International League of Associations for Rheumatology

**Subjects:** 1. Arthritis, Juvenile Rheumatoid --  
Physiopathology, 2. Biological Markers -- Blood  
3. Hereditary Diseases -- Physiopathology  
4. Immunoglobulins -- Analysis, 5. Immunoglobulins --  
Diagnostic Use, 6. Inflammation -- Physiopathology

Stosur, S., Liu, N., Rodrigues, S., Sandoval-Herrera, C., Mundt, L., & Garon, J. (2011). Serum water analysis in normal pregnancy and preeclampsia. *Clinical Laboratory Science*, 24(2), 99-104.

**Abstract:** Hemodilution and hemoconcentration affect hematology measurements and serum analyte concentrations but whether a given blood sample is hemodiluted or hemoconcentrated is frequently not known. Preeclampsia (PE) is a serious pregnancy complication and samples obtained from PE patients may be relatively hemoconcentrated when compared to those of normal pregnancy, where hemodilution is the norm. Laboratory test results may appear similar when values would differ if adjusted for hemodilution and hemoconcentration. We sought to determine if serum water (SW) content analysis can facilitate differentiation of the hemodilution of normal pregnancy from the hemoconcentration of PE, within the broader search of a clinical laboratory method to potentially correct for pregnancy-related, sample concentration variations. Serum samples from 59 non-pregnant, 64 normal pregnant, 23 mild PE, and 8 severe PE patients were tested for SW content. The mean results in g/IOOg were as follows: 91.15,91.86,92.00, and 92.46 respectively. SW data were also compared with corresponding total protein (TP), serum albumin (SA), and hematocrit (HCT) results. The t-test was significant ( $p = <0.001$ ) for TP, SA, HCT, and SW in group-by-group comparisons. SA

and SW were significantly, inversely correlated in the normal pregnant and severe PE groups, while TP and SW were significantly, inversely correlated in all groups. Correlation coefficients were stronger in the pregnancy groups than the non-pregnant group. This study demonstrates differences in the SW content between: non-pregnant, normal pregnant, mild PE, and severe PE patient sera.

**Subjects:** 1. Plasma Volume -- In Pregnancy  
2. Pre-Eclampsia, 3. Pregnancy, 4. Water -- Blood



Otto, C. N. (2011). Focus: patient safety and the medical laboratory. Patient safety and the medical laboratory an introduction. *Clinical Laboratory Science*, 24(2), 105-107.

**Abstract:** LEARNING OBJECTIVES 1. Define the six Institute of Medicine aims to improve the quality of the healthcare delivery system. 2. Classify and provide an example of each type of error. ABBREVIATIONS: FN, false negative; FP, false positive; 10M, Institute of Medicine INDEX TERMS: Quality Improvement; Healthcare Quality Assurance GLOSSARY: Error, "failure to complete a planned action as intended (error of execution) or the use of a wrong plan to achieve an aim (error of planning)"; 2 Lapse, omission of automatic action; Healthcare quality, "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge"? Patient safety, "freedom from accidental injury: avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from the process of care"; 2 Slip, wrong automatic action.

**Subjects:** 1. Clinical Laboratories, 2. Human Error  
3. Patient Safety, 4. Quality Assurance

Otto, C. N. (2011). Focus: patient safety and the medical laboratory. Patient safety and the medical laboratory using the IOM aims. *Clinical Laboratory Science*, 24(2), 108-113.

**Abstract:** LEARNING OBJECTIVES 1. Identify steps in the total testing process at the greatest risk for errors. 2. Explain the relationship of evidence-based management to evidence-based medicine. 3. Discuss the difference between patient-centered and system-focused healthcare. 4. Define timeliness with respect to patient-centered care. 5. Differentiate efficient and effective laboratory testing services. 6. Identify methods to provide equitable laboratory services. ABBREVIATIONS: ADA, American Diabetes Association; A1C, hemoglobin A1c; EBM, evidence-based medicine; EBMgt, evidence-based management; ED, emergency department; EHR, electronic health record; LOS, length of stay; POCT, point-of-care testing; T4, thyroxine; TAT, turnaround time; TSH, thyroid stimulating hormone; TIP, total testing process.

**Subjects:** 1. Clinical Laboratories -- Administration  
2. Patient Safety

Colemboski, K. (2011). Improving patient safety: lessons from other disciplines. *Clinical Laboratory Science*, 24(2), 114-119.

**Abstract:** LEARNING OBJECTIVES 1. Compare data collection methods used to describe error incidence in health care and the aviation industry. 2. Discuss regulatory requirements and public accessibility of information regarding errors for aviation and medicine. 3. State the benefits of checklists in aviation and medicine. 4. Describe the improvements in healthcare quality as a result of implementation of electronic health record systems. 5. Discuss the applications and benefits of team-based training in healthcare.

**Subjects:** 1. Clinical Laboratories, 2. Patient Safety  
3. Quality Assurance, 4. Quality Improvement

McGlasson, D. L. (2011). Career research opportunities for the medical laboratory scientist. *Clinical Laboratory Science*, 24(3), 130-135.

**Abstract:** Medical Laboratory Scientists (MLS) typically practice in hospital laboratories; however there are multiple alternatives in research. This article details the advantages of working in a variety of research laboratory settings. These include public institutions, federal laboratory workplaces, private facilities, and industry settings. A view of the different research laboratory settings such as public institutions, federal laboratory workplaces, private facilities, and industry settings will be provided. An assessment on how MLS professionals can prepare for a career in research is outlined and the report concludes with a brief summary of the various aspects of the research setting.

**Subjects:** 1. Medical Technologists, 2. Research Personnel

Carvalho, J. (2011). Importance of clinical microbiologists for U.S. healthcare infrastructure. *Clinical Laboratory Science*, 24(3), 136-141.

**Abstract:** Clinical microbiologists are highly skilled scientists within national hospitals and reference laboratories who diagnose patients with infections by emerging pathogens. Most advanced training for clinical microbiologists occurs at universities, where an individual can receive certification as a "Medical Laboratory Scientist" (MLS). Unfortunately, many MLS programs have closed in the United States and this has caused a shortage of clinical microbiologists at U.S. hospitals and reference laboratories. This paper explores the present crisis in MLS training and its ramifications for the emergence of antibiotic-resistant bacteria, the economics of hospitals, and the overall health of the nation, and provides resolutions for better public health policy with respect to MLS education.

**Subjects:** 1. Medical Technologists, 2. Microbiology -- Manpower, 3. Personnel Shortage, 4. Schools, Allied Health -- Trends

Sinsabaugh, C. (2011). Atypical cytogenetics in therapy-related myelodysplastic syndrome secondary to indolent B-cell lymphoma. *Clinical Laboratory Science*, 24(3), 142-146.

**Abstract:** A case of therapy-related myelodysplastic syndrome (t-MDS) with unusual cytogenetics is presented. While therapy related myeloid neoplasms account for 10-20% of all myeloid neoplasms, 90% of therapy related myelodysplastic syndromes(MOS) present with a del(7q) or a del(5q) and fewer than 1% present with a del(20q). In this case, the common cytogenetic pattern of either del(7q) or del(5q) is absent while presenting with an abnormal del(20q). Also demonstrated is the potentially poor prognostic indicator of cytomegalovirus (eMV) seropositivity, even when seropositivity is matched between donor and recipient of hematopoietic stem-cell transplant. The patient also continues to demonstrate the inherent dangers of a stem-cell transplant, presenting with graft-versus-host disease (GvHD) while being a haploidentical 10 out of 10 HLA match to the allogeneic stem cell donor.

**Subjects:** 1. Lymphoma, B-Cell -- Drug Therapy  
2. Myelodysplastic Syndromes -- Chemically Induced  
3. Myelodysplastic Syndromes -- Familial and Genetic

Moralez, E., & Lofland, D. (2011). Shigellosis with resultant septic shock and renal failure. *Clinical Laboratory Science*, 24(3), 147-152.

**Abstract:** Septic shock is a rare, potentially life threatening complication of bacterial dysentery. The clinical presentation of septic shock includes hypotension, bleeding, hypoxia, acidosis, and jaundice. Historically gram-negative organisms were the most frequent cause of nosocomial bloodstream infections. However isolation of gram-positive organisms has become increasingly frequent with *Staphylococcus* species accounting for over one half of all nosocomial bloodstream pathogens. Bacterial dysentery is an acute diarrheal illness characterized by abdominal cramping, fever, and the production of mucoid, bloody stools. Laboratory findings include positive stool culture and increased leukocytes in direct fecal exam. Chemistry and hematology values may be abnormal. The disease is usually self-limiting but administration of antibiotics and rehydration therapy may be warranted in severe cases. This case study describes a 33 year old male who presented with diarrhea and diabetic acidosis and subsequently developed respiratory distress and renal failure due to shigellosis. Discussion of disease pathogenesis and treatment are provided.

**Subjects:** 1. Dysentery, Bacillary, 2. Shock, Septic

Bobryk, S., & Goossen, L. (2011). Variation in pipetting may lead to the decreased detection of antibodies in manual gel testing. *Clinical Laboratory Science*, 24(3), 161-166.

**Abstract:** BACKGROUND: Variation in pipetting technique can contribute to the failed detection of weakly reactive antibodies. This study evaluated the impact of pipetting technique on the sensitivity of antibody detection using the manual gel test. STUDY DESIGN AND METHODS: A total of 115 plasma antibodies were evaluated using the manual gel test (Ortho ID-MTS, Raritan, NJ). All antibodies were diluted to obtain 1+, w+, and undetectable reactions. Testing was performed in parallel using two pipetting techniques: cells and plasma pipened into the gel card to allow an air gap and without an air gap. RESULTS: When cells and plasma were pipetted into the gel card without air gap, 12.4% of 1 + reactions ( $p < 0.001$ ) and 81.0% of w+ reactions ( $p < 0.001$ ) were not detected. Overall, 24.7% of clinically significant ( $p < 0.001$ ) and 29.7% of nonspecific antibodies ( $p < 0.05$ ) became nonreactive. Antibody screening tests failed to detect 26.0% of passively acquired anti-D ( $p < 0.001$ ), 38.0% of anti-E ( $p < 0.001$ ), 28.0% of anti-K." ( $p < 0.001$ ), 20.0% of anti-K ( $p < 0.05$ ), and 35.0% of warm auto antibodies ( $p < 0.05$ ). CONCLUSION: Cells and plasma pipetted manually without leaving an air gap in the gel card failed to detect clinically significant antibodies. An optimal pipetting technique is recommended to ensure the detection of weakly reactive antibodies.



**Subjects:** 1. Antibodies -- Analysis, 2. Clinical Competence, 3. Human Error, 4. Serologic Tests

Adams, A., McCabe, K., Zundel, C., Price, T., & Dahl, C. (2011). Perceived emotional aptitude of clinical laboratory sciences students compared to students in other healthcare profession majors. *Clinical Laboratory Science*, 24(3), 167-171.

**Abstract:** Emotional aptitude can be defined as the ability to recognize and manage one's own emotions and interpret the emotions of others. It has been speculated that Clinical Laboratory Sciences students may lack the emotional skills to most effectively interact with patients and other health care professionals, therefore a logical hypothesis would be that they would evaluate their own emotional intelligence lower than students from other healthcare majors. While this has been a topic of discussion in health care, a lack of research has been conducted to validate this assumption. This study assesses the perceived emotional aptitude of Clinical Laboratory Sciences students compared to students of other healthcare majors in the Dumke College of Health Professions at Weber State University. The perceived emotional aptitude of the healthcare students was determined by completion of a self-evaluation questionnaire that included questions about one's emotions, their understanding of others' emotions, and how they manage conflict. A total of 401 questionnaires were completed, compiled, and analyzed. Although minor differences were seen in the responses, statistical analysis found these differences to be insignificant. The perceived emotional aptitude of Clinical Laboratory

Sciences students was insignificantly different than that of students of other health care majors at the Dumke College of Health Professions.

**Subjects:** 1. Emotional Intelligence, 2. Medical Technologists

Nagaraju, S., Girish, ., Pan, Y., Easley, K., & Keeparaju, K. (2011). Estimation of serum hyaluronidase activity overcoming the turbidity interference. *Clinical Laboratory Science*, 24(3), 172-177.

**Abstract:** The assay of mammalian hyaluronidases (HAases) is important in understanding the role of the hyaluronan-hyaluronidase (HA-HAase) system in various pathophysiological processes. Despite several quantitative assay method options, the Morgan-Elson colorimetric method modified by Reissig et al [1] is considered the best for determining the activity in clinical samples. However, the sensitivity of the method was greatly limited by presence of protein above 400 Ilg due to turbidity interference that led to chromogen quenching. Therefore, an effort has been made to reinvestigate the Reissig et al method. In the reinvestigated method, a standardized optimal 0.32 M potassium tetraborate (PTB) was used against 0.13 M (native) to overcome the turbidity interference. The estimated mean OD at 585 nm of serum for native method was 0.043 (95% CI: 0.040 to 0.045), while that for the re-investigated method was 0.138 (95% CI: 0.133 to 0.143,  $p < 0.0001$ ). The mean OD at 585 nm of serum of native method was significantly lower than that of re-investigated method ( $p < 0.05$ ) at all protein levels. This was also true for estimated mean OD at 585 nm of plasma. The mean intrasample CVs for native and re-investigated methods were 0.9% and 0.5%,

respectively, for normal serum. Furthermore, the repeatability coefficient of normal serum for native was 0.003 IU, while re-investigated method experienced that of 0.002 IU.

**Subjects:** 1. Colorimetry, 2. Hyaluronidase -- Analysis

Gacad, V., & Waller, K. (2011). Cryptogenic hepatitis: a case study in autoantibody negative autoimmune hepatitis. *Clinical Laboratory Science*, 24(4), 196-201.

**Abstract:** A 76 year old white-female initially presented with signs and symptoms of acute hepatitis. While liver function tests were elevated, viral hepatitis and autoimmune hepatitis panels were negative. The patient was subsequently discharged on the 4th day of hospitalization when her condition appeared to stabilize. Four weeks later she was readmitted to the hospital, this time with signs and symptoms of acute liver failure with ascites, confusion, and jaundice. A liver biopsy was performed with pathology suggestive of an autoimmune etiology despite the negative autoimmune antibody panel. She was diagnosed with cryptogenic autoimmune hepatitis. The patient was placed on intravenous steroids and later oral prednisone that resulted in the resolution of the liver failure and disappearance of the encephalopathy along with a downward trend of the liver enzymes, bilirubin and the prothrombin time. One year later, the liver enzymes had normalized and the autoimmune disease remained in remission with maintenance medications consisting of low dose prednisone and azathioprine.

**Subjects:** 1. Autoimmune Diseases -- Diagnosis  
2. Hepatitis -- Diagnosis

Fydryzewski, N. A., & Hanna, P. H. (2011).

Acanthamoeba keratitis -- a diagnostic challenge. *Clinical Laboratory Science*, 24(4), 202-207.

**Abstract:** This is a case study of a 23 year old male diagnosed with Acanthamoeba keratitis. Initial misdiagnosis and inappropriate treatment lead to increased severity of the infection requiring surgical intervention. This case illustrates the complexity of Acanthamoeba keratitis infection, highlighting the diagnostic challenges which often begin with misdiagnosis and treatment, the role of the laboratory in providing confirmatory testing, and the relevance of patient knowledge related to contact lens wear and care.

**Subjects:** 1. Acanthamoeba Keratitis -- Diagnosis  
2. Diagnostic Errors

Lennon, A., & Hu, P. (2011). Clinical molecular testing: subspecialty, entry-level or specialist certification?. *Clinical Laboratory Science*, 24(4), 208-211.

**Abstract:** Some clinical laboratories require workers who have basic knowledge in molecular techniques (such as fluorescent in situ hybridization and polymerase chain reaction). Exclusively molecular diagnostic laboratories need workers to be competent in a variety of cutting edge molecular technologies, such as DNA sequencing, array-based comparative genomic hybridization, quantitative polymerase chain reaction, and many other techniques. Having only one certification for molecular biology at the entry level, as newly prescribed by the Board of Certification, doesn't accurately define the two very differently trained types of people these differing types of laboratories require. Creating a second molecular certification, at the specialist level, would address this issue positively.

**Subjects:** 1. Certification, 2. Medical Technologists  
3. Molecular Biology, 4. Molecular Diagnostic  
Techniques



Taylor, T., & Zitzman, M. B. (2011). *Dipylidium caninum* in a 4-month old male. *Clinical Laboratory Science*, 24(4), 212-214.

**Abstract:** *Dipylidium caninum*, known as the double-pored dog tapeworm, is a parasite that commonly infects dogs and cats worldwide. Humans may be an accidental host if the infective stage, the cysticeroid larva, is ingested. 1,2 Although rare, it is more commonly seen in infants and children.2-5 This case study involves an infant misdiagnosed with pinworm infection twice before a laboratory evaluation was able to confirm *Dipylidium caninum*. Accurate diagnosis is important, as treatment for pinworm infection will not eliminate *Dipylidium caninum*.

**Subjects:** 1. Cestode Infections -- Diagnosis  
2. Cestode Infections -- Microbiology

Finnegan, K., & Cutsforth, G. (2011). Hemostasis test compatibility with capped and uncapped tubes. *Clinical Laboratory Science*, 24(4), 215-220.

**Abstract:** OBJECTIVE: The objective of this study was to determine the substantial equivalence of routine and specialty hemostasis testing on capped versus uncapped evacuated blood collection tubes (3.2% sodium citrate tubes, 2.7ml draw) on assays representing three most common assay types: viscosity, chromogenic, immunoturbidometric. Coagulation instrument manufacturers may provide a list of manufacturers and tube reference numbers that are compatible with their capping technology on their instruments. However, the use of other blood collection tubes is the responsibility of the user and should be evaluated. DESIGN: Seventy one volunteers donated two tubes (one each of two manufacturers) and the PT/INR, APTf, fibrinogen, AT and vWF assays were performed first on the capped tube, then on the same tube, uncapped. Assays were performed on the STACompact' coagulation analyzer with reagents, kits and associated products (calcium chloride, DeSorb U, etc.) provided by Diagnostica Stago, Inc., Parsippany, New Jersey. SETTING: The patient specimens were collected at the University Hospital at Stony Brook Outpatient Clinic. Assays were performed in the Stony Brook University, Department of **Clinical Laboratory Science** Teaching Laboratory.

**PATIENTS/SPECIMENS:** Informed consent was obtained from normal donors, individuals on oral anticoagulant therapy, ages 19 to 85 years, males and females. The Institutional Review Board approved this study (reference number 103249; Principle Investigator: K. Finnegan). **MAIN OUTCOME MEASURE:** Singlicate values were compared between the samplings from capped and uncapped tubes by linear regression to determine the substantial equivalence. Singlicate measurements were made to maintain sample integrity to complete testing within four hours of the specimen draw. **RESULTS:** Linear regression analysis and ANOVA demonstrated a strong correlation between capped and uncapped values with no bias. The correlation coefficient was greater than 0.763 for all assays and the regression line intercept was within acceptable error for the assays (see discussion, biological variation). The p value was greater than 0.08 for all assays. **CONCLUSIONS:** The authors conclude that there is no significant difference between PTIINR, APIT and fibrinogen analysis on the capped or uncapped blood collection tubes tested in this study. Given the inherent biological variation of AT and vWF, the authors conclude that there is no significant difference between AT and vWF analysis on the capped or uncapped blood collection tubes tested in this study.

**Subjects:** 1. Blood Coagulation Tests, 2. Hemostasis -- Evaluation, 3. Specimen Handling -- Methods

Kenwright, K., Liddell, P. W., Bloom, L., Zucker-Levin, A., Nolen, A. H., Faulkner, L. W., & Batorski, R. E. (2011). Salivary cortisol levels in students challenged with a testing stressor. *Clinical Laboratory Science*, 24(4), 221-226.

**Abstract:** OBJECTIVE: The objective was twofold. The focus of the study was primarily to determine if the stress of a particularly difficult exam could cause students to lose the normal diurnal variation seen in human cortisol levels and secondarily, to validate the use of a competitive enzyme immunoassay for salivary cortisol. DESIGN: Physical therapy students enrolled in Research Design were asked to participate in the study by collecting baseline evening and morning salivary cortisols during what was regarded as a relatively stress free time in the Fall of 2009. The following spring, the same students were asked for samples the evening before and morning of their first Kinesiology test, traditionally a stressful time. Method validation was accomplished using instrumentation owned by the Medical Laboratory Science (MLS) Program and analysis was performed by MLS faculty and a second year MLS student. SETTING: Participants were enrolled in the College of Health Sciences at the University of Tennessee in Memphis. Sample collection and testing was performed in the student laboratory of the Medical Laboratory Science Program. PARTICIPANTS: Physical therapy students in their first year of a three-year entry level doctorate program, DPT. RESULTS: This group of

students did not lose their diurnal variation of cortisol. However, an unexpected finding was noted: the students' salivary cortisol specimen collected in the morning of the fall semester was significantly higher than the salivary cortisol specimen collected the morning of the test in the spring semester ( $p = .019$ ). Method validation was successful demonstrating a strong correlation ( $r = 0.915$ ) when compared to the reference laboratory. CONCLUSIONS: Cortisol diurnal variation was not lost in the study participants, but further studies should be performed due to the low percentage of students completing the study and the lack of demographic diversity. Even though the method validation in the student laboratory setting demonstrates that it is indeed possible to obtain the same excellent correlation as is seen in a clinical setting, the student laboratory is not CLIA certified, so assays can be performed for research use only.

**Subjects:** 1. Achievement Tests, 2. Hydrocortisone -- Blood, 3. Saliva, 4. Stress

Moore, M., Okelberry, E., Cordingly, K., Drake, A., & Robinet, Z. (2011). DePEGylation studies: PEG-RBC stability in conditions consistent with massive transfusion. *Clinical Laboratory Science*, 24(4), 227-232.

**Abstract:** Each year the United States population receives an estimated 12 to 14 million units of packed red blood cells (RBCs) and whole blood. 1,2 It is estimated that 33% of transfusions associated with trauma are with unmatched type O RBCs (UORBC).<sup>3</sup> UORBCs have been proven effective and relatively safe<sup>3</sup> however, by masking RBC surface antigens the risk of transfusion reaction may be further decreased. It is, therefore, important to evaluate and validate the stability of antigen masked RBCs, which may play a part in avoiding transfusion reactions. These antigen-masked RBCs would be regularly subjected to abnormal in vivo conditions commonly associated with massive transfusion such as lactic acidosis, bacteremia, and in vitro irradiation, which is frequently used to sterilize and decrease T Lymphocyte counts in RBC units before transfusion. This study compared two methods of masking RBC antigens by PEGylation: maleimidePEGylation and cyanuric chloride-PEGylation. RBC PEGylation effectively masks the Rh(D) antigen<sup>4,5</sup> and PEG-RBC bond stability was evaluated by comparison of pre and post exposure agglutination with anti-D sera. While the stability of maleimide-PEG-RBCs remained unaffected, the cyanuric chloride-PEG-RBCs

remained stable in the bacteremia and irradiation studies, but critical concentrations of lactic acid caused dePEGylation. Further studies are warranted to ensure in vivo stability.

**Subjects:** 1. Antigens, Surface, 2. Blood Transfusion Reaction -- Prevention and Control, 3. Erythrocyte Transfusion, 4. Polyethylene Glycols

Laudicina, R., Fenn, J., Freeman, V., McCoy, C.,  
McLane, M., Mundt, L., & ... Shanahan, K.  
(2011). Focus: building research through MLS  
curricula. Research in clinical laboratory science:  
professionals' involvement. *Clinical Laboratory  
Science*, 24(4), 235-242.

**Abstract:** LEARNING OBJECTIVES Identify CLS practitioners' sources of knowledge of research principles and hands-on research training. List activities that CLS practitioners believe would help improve their research skills. Describe research components of CLS educational programs. Characterize activities included in CLS undergraduate and master's student research projects. List perceived barriers to research participation by undergraduates and master's students in CLS educational programs. OBJECTIVES: To describe current qualitative and quantitative aspects of research engagement and other scholarly activities conducted by **clinical laboratory science** (CLS) professionals across a range of employment settings. DESIGN: A link to a 3-part online survey was sent by electronic mail to 7,572 members of the American Society for **Clinical Laboratory Science** and 500 program directors. SETTING: email message, on-line survey PARTICIPANTS: all ASCLS members and all directors of accredited clinical laboratory educational programs MAIN OUTCOME MEASURES: Quantitative and qualitative measures of professionals' engagement in



research and other scholarly activities RESULTS: 556 of 7572 (7.3%) persons completed the survey. Thirty-two percent of survey respondents reported spending between 1 to >40 work hours per week conducting research with 68% of respondents not participating in research activities. Conducting research is an employment requirement for 18% of survey participants. Twenty-nine percent of respondents have published at least one research article, and 47% of respondents who conduct research have published studies in the journal **Clinical Laboratory Science**. More than 57% of respondents participate in non-research scholarly activities as part of their employment. CLS professionals who conduct research are more likely to do applied, clinical, or educational research than other types of research. Fifty-seven percent of respondents who conduct research lack external funding for their work. Ninety-three percent of total research dollars is obtained by respondents who hold the Ph.D. degree. The perception of the importance of conducting research varies by employment position. Barriers to participation in research include lack of inclusion of research in the job description, time constraints, inadequate research funding, limited opportunity, and lack of space and equipment. CONCLUSIONS: CLS professionals participate in research in limited numbers, and are more likely to engage in non-research types of scholarly activities. Numerous barriers are identified which impose limits to conducting research. Over half of CLS's research efforts lack external funding. Although there

was broad representation among participants across educational levels, employment settings, and job positions, the number of survey respondents was limited. Possible directions for future research include conducting this survey using members of additional professional organizations.

**Subjects:** 1. Education, Medical Laboratory Technology, 2. Medical Technologists, 3. Research

Laudicina, R., Fenn, J., Freeman, V., McCoy, C., McLane, M., Mundt, L., & ... Shanahan, K. (2011). Focus: building research through MLS curricula. Research in clinical laboratory science: professionals' educational preparation. *Clinical Laboratory Science*, 24(4), 243-248.

**Abstract:** LEARNING OBJECTIVES Identify CLS practitioners' sources of knowledge of research principles and hands-on research training. List activities that CLS practitioners believe would help improve their research skills. Describe research components of CLS educational programs. Characterize activities included in CLS undergraduate and master's student research projects. List perceived barriers to research participation by undergraduates and master's students in CLS educational programs. OBJECTIVE: To describe the educational preparation of CLS professionals for conducting research. DESIGN: A link to 3-part online survey was sent by electronic mail to 7,572 members of the American Society for **Clinical Laboratory Science** and 500 program directors SETTING: email message, on-line survey PARTICIPANTS: all ASCLS members and all directors of accredited clinical laboratory educational programs MAIN OUTCOME MEASURES: Quantitative and qualitative measures of professionals' educational preparation for conducting research and descriptions of program curricula in

research. RESULTS: 556 of 7572 (7.3%) persons completed the survey. Twenty-two percent of CLS undergraduate educational programs offer a separate research course in the curriculum, and 37% require completion of a research project. Barriers to participation in research by undergraduates include time limitations within the curriculum, insufficient faculty time, and lack of funds, space, and equipment. Increased emphasis on developing research skills is found in educational programs at the master's degree level. CONCLUSIONS: The formal educational background of many CLS professionals may leave them unprepared or underprepared for conducting research. Although there was broad representation among participants across educational levels, employment settings, and job positions, the number of survey respondents was limited. Possible directions for future research include conducting this survey using members of additional professional organizations.

**Subjects:** 1. Medical Technologists



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